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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/586,638

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Taro Kita

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EXAMINER

NILAND, PATRICK DENNIS

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,638	Applicant(s) KITA ET AL.	
	Examiner ROBERT S. WALTERS JR	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/19/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

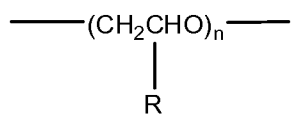
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DETAILED ACTION***Status of Application***

Claims 1-5 are cancelled. Claims 6-22 are pending and presented for examination.

Specification

The disclosure is objected to because of the following informalities: The formula on pages 8, 15, 17 and 20 is presented incorrectly. It should be correctly presented as



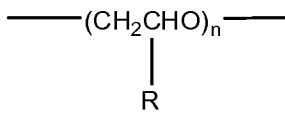
, as the valency of carbon is incorrect as it presently presented, with the R group off of a carbon already having four bonds.

Appropriate correction is required.

Claim Objections

Claims 7, 9 and 10 are objected to because of the following informalities: the said two-pack reaction hardening type urethane resin solution should be reference character (B), rather than (A). Appropriate correction is required.

Claims 9 and 10 are objected to because of the following informalities: the formula is



incorrect, it should be correctly presented as . Appropriate correction is required.

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Claims 11-14 are objected to because of the following informalities: the “raid reaction hardening” should be changed to “said reaction hardening”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 11 and 19 (for its dependence from claim 11) are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 11 recites the limitation "said plasticizer component (c)". There is insufficient antecedent basis for this limitation in the claim.
2. Claims 11-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "preferably" in claims 11-13 is a relative term which renders the claim indefinite. The term "preferably" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 6-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chong et al. (U.S. PG PUB No. 2001/0043990) in view of Matsuoka et al. (JP 2003-290871).

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Regarding claims 6-14, Chong teaches a method for smoothing a surface of a powder-sintered laminated resin model having a porous rough surface (abstract) comprising:

- (a) a resin impregnation step of dipping the model into a polyurethane resin solution to impregnate the surface of the model with the hardening polyurethane resin (0019-0023); and
- (b) a resin hardening step of bringing up the model impregnated with the resin and hardening the resin (0022).

Chong teaches that the resin solution is a polyurethane, but fails to teach the specifics of this resin solution or decreasing the pressure.

First, it is well known in the impregnation art to decrease the pressure during impregnation to help open the pores of the substrate for impregnation with the resin. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Chong's method by decreasing the pressure during impregnation. One would have been motivated to make this modification as it would help to open the pores allowing for the resin to impregnate the entire article.

Second, Matsuoka teaches a two-pack reaction hardening type urethane resin (to prepare a resin model (0001)) with a working life of 1-5 minutes having a polyfunctional polyol component, having an average functional group number of 2.8, a polyfunctional polyisocyanate having an average functional group number of 2 or more, and a liquid plasticizer (0049) in 1-30% by weight having polyether chains in 2-25 weight % (0017-0021). Matsuoka further teaches that the ratio of NCO/OH is in the range of 0.7-1 (0018). Matsuoka finally teaches that the plasticizer component is micro-dispersed through phase separation in the resin solution (0019

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and 0045). Though, Matsuoka fails to particularly teach the range of the average functional group of the polyisocyanate being from 3 to 5, or the viscosity of the solution being 7 to 30 Pas, it would have been obvious to one of ordinary skill in the art that these parameters are result effective variables, as adjusting the viscosity will adjust the ability of the solution to impregnate the substrate and the depth of the impregnation, while adjusting the average functional group content of the polyisocyanate will adjust the hardness and other properties of the cured material (0046). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute Matsuoka's two-pack reaction hardening type urethane resin in place of the generic polyurethane resin employed by Chong. One would have been motivated to make this modification as it would increase productivity in Chong's method, by lowering the processing time, as Matsuoka's solution only has a working life of 1-5 minutes. Furthermore, one would have been motivated to make this modification as one of ordinary skill in the art could have substituted this resin solution for Chong's with a reasonable expectation of success (especially given that both resins are ultimately being employed in the rapid fabrication of models, see Matsuoka at 0001) and the predictable result of providing a rapidly hardening impregnation solution.

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4. Claims 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hongjun et al. (“A Note on Rapid Manufacturing Process of Metallic Parts Based on SLS Plastic Prototype”) in view of Chong and Matsuoka.

Regarding claims 15-22, Hongjun teaches a process for lost wax precision casting using a powder-sintered laminated resin model (abstract, Figure 2 on page 711, and Section 3, first paragraph which bridges pages 710-711). Hongjun fails to teach the model prepared according to the methods of claims 6, 7 and 9-14). Chong and Matsuoka teach a method for preparing a powder-sintered resin model having a smoothed surface (see rejection above). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Hongjun's process by using a smoothed model prepared according to Chong and Matsuoka's method. One would have been motivated to make this modification as the use of a smoother model according to Chong and Matsuoka's method would ultimately result in a smoother, cleaner and more defined mold (see Hongjun at last line 1st column on page 711 to 2nd column, line 5, where Hongjun discloses that the surface roughness of the mold is dictated by the surface roughness of the model).

Conclusion

Claims 6-22 are pending.

Claims 6-22 are rejected.

No claim is allowed.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT S. WALTERS JR whose telephone number is (571)270-5351. The examiner can normally be reached on Monday-Thursday, 6:30am to 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571)272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ROBERT S. WALTERS JR/
February 23, 2009
Examiner, Art Unit 1792

/Michael Barr/
Supervisory Patent Examiner, Art Unit
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